# Children's Acquisition of Linguistic Register

A Senior Honors Thesis

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by

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*Abstract*

Linguistic registers are manners of speech that vary on measures of intonation, prosody, and vocabulary according to social or environmental cues. This study examined the development of the Infant-Directed, Casual, and Formal linguistic registers in children ages three- to five-years-old. This age range was selected because previous findings established that four-year-old children alter their speech when talking to infants (Shatz & Gelman 1973). This study was designed to look at how much children know about when and why speech changes based on speaker-addressee relationship. It also investigated whether register comprehension precedes production, as is the case with syntactic and semantic linguistic development (Huttenlocher 1974). The findings of this study indicate that children attune to social and environmental markers when processing language and that they are able to understand that register is an aspect of language that changes as a function of addressee. In this way children's knowledge of linguistic register mirrors the adult understanding of bilingualism. Results also indicate that the age of register comprehension precedes that of production. Children ages three, four, and five successfully identified the correct usage of the Infant-Directed and Casual registers in a forced-choice task. Five-year-olds were significantly more accurate than three-year-olds. Performance on the Formal speech trials followed the same trend.

*Background*

Something very interesting happens when adults talk to infants. Our speech slows, our pitch raises, and we issue long, smooth vowel sounds (Fernald 1992). How does a five-year-old boy standing near his baby sister know not to answer adults when they send this type of utterance his way? He is using his knowledge of linguistic registers. Registers are the patterns of pitch, intonation, vocabulary, and rate of speech change that occur based on a specific social context or speaker-addressee relationship (Biber & Finegan 1994). A child who is able to tell when a question is meant for his baby sister is picking up on these changes and the social information that they convey. This study was conducted in order to find out how children think about linguistic registers. How much do they know about the factors that effect a shift in register? Do they know that everyone is capable of using different registers or do they think that some people always speak the same way? This study addresses these questions as well as expanding the existing research on how knowledge of registers changes as children age.

Once known as "Motherese" or "Babytalk," the Infant-Directed register has been the subject of quite a bit of scientific research (Garnica 1977). Two factors make it an ideal candidate for research. Firstly, Infant-Directed speech is recognizable because it has such a definite set of addressees. Though it is sometimes adapted for use between romantic partners, Infant-Directed speech is used primarily with infants (Bombar 2005). Not all registers have such a clearly defined addressee category. Consider the newspeak register used by anchors on the nightly news (Maskey & Hirschberg 2005). They use a single register to address a very diverse audience. Infant-Directed speech is triggered by the addressee. It is also an extremely common register. This familiarity makes it a good

candidate for research on children. Other registers that might be just as distinctive and encountered daily by many, such as the “Legalese” register used in a courtroom, are not frequently used around children (Danet 1980). This study looked at Infant-Directed speech and at the Casual and Formal registers. The Casual and Formal speech registers were selected because they are encountered as frequently as Infant-Directed speech, differ greatly from one another and from Infant-Directed, and the three registers have minimal addressee overlap. The Infant-Directed register is used primarily with infants, the Formal register is used when addressing authority figures, and the Casual register is used when addressing peers in everyday situations (Nippold, Leonard & Anastopoulos 1982). These three registers with distinct characteristics and target groups were selected in order to insure that when asked to identify a register's addressee in a forced decision task the subject would have one clearly correct choice and one clearly incorrect. Using these registers also insured that the results of this study could be compared to findings from previous studies that have focused on the production of these three types of speech.

This study looks specifically at the comprehension abilities of three-, four-, and five-year-olds. This age range was selected because children ages three to five are known to use shorter, simpler utterances with younger siblings than with peers and adults. Children in this age range produce a simplified form of Infant-Directed speech but do not speak differently when addressing peers and adults (Shatz & Gelman 1973). Researcher Elaine Andersen found that in a play situation, four-year-old children can shift certain aspects of their speech based on their social role (1990). Subjects in her study were given puppets with different social roles, such as mommy, daddy, doctor, and teacher. They then pretended to be the puppet’s character in conversation. Children in Andersen’s study

varied the pitch and complexity of their utterances depending on which character they were pretending to be. Andersen's research is typical of the existing work on linguistic register, in that it focuses on children's production of different registers rather than on their ability to comprehend these registers and the meaning behind them.

In language acquisition, comprehension often precedes production (Fraser et. al 1963). That is the case with both grammar and word meaning development (Huttenlocher 1974). This study will determine whether register comprehension, or, the ability to identify the correct usage of a given register, also precedes production. As a register reflects the speaking environment, it contains social cues. To identify when registers are correctly employed, children have to attune to social cues while listening. The goal of this study was to determine whether children in the three-, four-, and five-year-old age groups are able to identify the correct speaker-addressee relationship for the Infant-Directed, Casual, and Formal speech registers. Success would indicate that children are aware of the social meaning that registers carry and can use them to infer information about the conversation partners.

The current study is modeled off of an earlier study conducted by Wagner et al. Wagner et al. used a picture and audio stimuli forced choice matching task designed to track register comprehension development. Wagner studied three- to five-year-old subjects with four categories of characters: babies, little English-speaking girls, little Spanish-speaking girls, and teachers. Wagner then introduced subjects to a puppet and told them that the puppet was going to be speaking to one of two characters. Two pictures of different types of people were placed side by side and an audio clip addressing one of them was played. In a trial testing Infant-Directed register comprehension, a picture of a

baby might be placed next to a picture of a teacher. Subjects would then listen to an Infant-Directed audio stimulus marked by a high pitch variation, slowed speech rate, and simple intonation (ex. "Awww, what's your name?") (Van de weijer 1997, Wagner et al. in press). They would then indicate that they understood the meaning of the Infant-Directed register by choosing the picture of the baby. They would then do the same task with Casual, Formal, and Spanish-language audio stimuli. Wagner et al. found that five-year olds preformed above chance on each register, four-year-olds did not perform above chance on trials with the casual and ID registers, and three-year olds preformed better than chance only when made to distinguish Spanish from English.

Wagner's findings indicate that although children's comprehension of linguistic register depends on the register that is being tested, overall comprehension does improve with age. These findings are in line with the conclusions of previous studies. Subjects understood that speaker-addressee relationships determine register at the same age that subjects in other studies have demonstrated the ability to produce these registers.

Though the oldest children in Wagner's study comprehended the meaning behind Casual, Formal, Infant-Directed, and Spanish-language speech it is possible that children know more about the registers at a younger age than the results indicate. This study altered Wagner's research design in attempt to eliminate four distinct factors that may have obscured children's register comprehension abilities. First, it is possible that the inclusion of Spanish-language stimuli made the task more difficult. Wagner included pictures of Spanish-speaking girls and a Spanish audio clip because children are known to be able to distinguish between languages in infancy (Mehler et al. 1988). This was done to determine whether the children were paying attention to the audio files (Wagner

et al. in press). It is possible that the presence of this set of stimuli made the remaining three English language stimuli seem more similar to one another. The current study removed the Spanish-language stimuli, both because of the difficulty and because of a second factor that may have affected the subjects' performance. It is possible that subjects in Wagner's study thought that they were supposed to select the picture of the speaker instead of the listener. Upon hearing the Spanish-language audio stimulus, children of all ages correctly pointed to the Spanish-speaking girl. Because the audio clip is said to be a recording of the puppet addressing the picture, children would have to assume that the puppet is bilingual. It is doubtful that three- and four-year-olds made this assumption. They then must have pointed to the Spanish-speaking girl because they heard someone speaking a language other than English. This would lead the subject to make the same error on later trials by pointing to the picture that could be the speaker, rather than the addressee. This would explain why Wagner's younger participants failed Infant-Directed trials. If they were choosing the picture that looked like the speaker rather than the listener, they would understandably not choose the picture of the pre-verbal baby. In no way did Wagner's Infant-Directed audio stimulus ("Awww, what's your name?") sound like it came from the mouth of a baby.

The third potential source of confusion in Wagner's study was the use of the puppet as a speaker. Children in Wagner's study were told that the audio stimuli were recordings of a puppet. The puppet was a small plush version of *Sesame Street*'s Zoe, a popular television character, but the voice used for the audio stimuli was not the same that Zoe has on television. Previous studies have shown that children are able to identify cartoon characters based on short voice samples (Spence et al. 2002). This means that

subjects familiar with Zoe would not think that the audio stimuli were coming from the puppet. This, like the inclusion of the Spanish-language stimuli, might cause subjects to think that the puppet was the addressee and that the people in the pictures were speaking. If subjects in Wagner's study confused the speaker and addressee roles that would explain the difficulty they had with the Infant-Directed and Casual registers. The final factor in Wagner's study that was changed in the current study was the adult speaker. In the current study a little girl was recorded to create audio stimuli instead of an adult and a drawing of a girl with a definite age was used rather than a puppet with an ambiguous age as in Wagner's study. The drawing of the little girl was featured in every visual stimulus to make it clear that she was the speaker in every trial. If Wagner's subjects were confused about who was speaking and who was listening, these modifications should help clarify that distinction. This change also makes it clear that the speaker and the little girl addressee are peers. To be sure that the correct Casual register addressee would be clear, the Teacher pictures used in Wagner's study are replaced with pictures of female Doctors. It is believed that the Doctor uniform conveys more authority than the business casual attire in which the Teachers were dressed. Female Doctors are used so that the gender of the addressee is not a variable that could influence a participant's response. Giving the speaker a clear identity as a young girl and replacing the adult figure with someone with a higher degree of authority could make it easier to see which listener should be addressed with Casual speech and which for which Formal speech is more suitable. This study hypothesizes that modifying Wagner's task as outlined above will allow children to demonstrate a better understanding of the Infant-Directed, Casual, and Formal linguistic registers and will allow them to do so at a younger age. It is expected

that four-year-olds will be more successful than three-year-olds and less successful than five-year-olds in comprehending each register. It is also expected that the Doctor-baby picture pairing will elicit the most correct responses because Infant-Directed speech has such a distinct pool of addresses and because adults explicitly tell children how and when to use Formal speech.

## *Methods*

Participants:

Participants in this study were 65 English-speaking male and female children from the Columbus area. The study took place in two separate, controlled environments: the Developmental Language and Cognition Lab (DLCL) on The Ohio State University's main campus in Columbus, Ohio, and the Center of Science and Industry (COSI), also in Columbus. The subjects were divided into three age groups: a three-year-old group (N=18) with a mean age of 43 months and a range of 36-47 months (11 female), a four-year-old group (N=18) with a mean of 53 months and a range of 48-59 months (9 female), and a five-year-old group (N=18) with a mean of 68 months and a range of 60 to 74 months (12 female). The data of 11 subjects were excluded: 6 because they failed two or more practice trials, 2 because they did not listen to the audio stimuli, 2 due to parental interference, and 1 due to experimenter error. All participants at COSI received a hand stamp and verbal thank you. All participants at DLCL received a verbal thank you and a choice between a t-shirt and a small toy. Parental consent was obtained for all subjects.

Materials:

The visual stimuli used in this experiment consisted of 18 pictures that were presented to the subjects. Each picture featured a speaker talking to an addressee. Six of these pictures portrayed a man and either a woman or another man engaged in conversation. These stimuli were used for practice trials. The experimental target pictures featured a drawing of Jenna, a little girl, speaking to a picture of either a baby, a little girl, or a female Doctor. See Appendix for pictures of the addressees.

fig. 1
Visual stimuli for a trial testing the Infant-Directed or Formal register

Each picture was neutral in background and differed from the others only in character content. Conversation role cues for each character are exaggerated to make clear who is the speaker and who is the addressee. The speaker had an open mouth and

comic speech lines. These laminated visual stimuli were 8.5" X 5.5". They were paired and displayed in a binder (fig. 1).

Practice trials:

All audio stimuli were recorded with video camera and presented as QuickTime audio files using a MacBook computer and a set of portable speakers. Two adult speakers, one male and one female, were recorded for the practice trial audio stimuli. Three common questions were used as practice stimuli:

| **Speaker** | **Question** |
|---|---|
| Adult male | *Would you like to go out to dinner?* |
| Adult female | *Did you like that movie we saw yesterday?* |
| Adult male | *Did you have a good time on your vacation?* |

All questions were asked in the Casual register. The practice trials were conducted to see if the subjects understood the task and the layout of the stimuli. They also provided the experimenter with an opportunity to give subjects feedback on aspects of the task that they did not understand.

Experimental trials:

All audio stimuli were recorded with video camera and presented as QuickTime audio files using a MacBook computer and a set of portable speakers. An eight-year-old female was recruited to record the audio stimuli for the experimental trials. Participants were told that this was the voice of Jenna, the illustrated speaker. The audio stimuli consisted of the child greeting a baby, a child, and a doctor in the ID, Casual, and Formal registers,

respectively. The stimuli were recorded according to the following script:

| **Register** | **Sentence** |
|---|---|
| Infant-Directed | *Awww, what's your name? Nice to meet you! Buh-Bye.* |
| Casual | *Hey, What's your name? Nice to meet 'cha. See ya' Later* |
| Formal | *Excuse me please, what is your name? It's very nice to meet you. Good bye.* |

Procedure:

Subjects took between 5 and 7 minutes to complete the study. Participation was videotaped at the DLCL to allow for later data coding. Coding for subjects who participated at COSI was done on-site by an observer.

Practice Trials:

The control trials were designed to assure that each subject was attuning to the audio when selecting a target picture. Subjects were presented with two pairs of pictures. The experimenter identified the speaker and addressee in each. The practice trial stimuli were presented as follows:

| | | |
|---|---|---|
| Practice Trial 1 | | |
| Top pair: Speaker-Man | Addressee-Woman | Audio-*Would you like to go* |
| Bottom Pair: Speaker-Woman | Addressee-Man | *out to dinner?* |
| Practice Trial 2 | | |
| Top pair: Speaker-Man | Addressee-Woman | Audio-*Did you like that* |
| Bottom Pair: Speaker-Woman | Addressee-Man | *movie we saw yesterday?* |
| Practice Trial 3 | | |
| Top pair: Speaker-Woman | Addressee-Man | Audio-*Did you have a good* |
| Bottom pair: Speaker- Man #2 | Addressee-Man | *time on your vacation?* |

After the audio stimulus was played the subject was instructed to choose the pair that matched the audio stimulus. This was a control measure because correctly selecting the pair that featured the speaker with the same gender as the audio stimulus speaker indicated that the subject was paying attention and could differentiate between the speaker and the addressee in a picture. Success on the practice trials indicated that the participant would understand who was the speaker and who was the addressee in the experimental trials.

Experimental trials:

Each experimental trial followed the same procedure. The participant was given a binder that displayed two pairs of pictures. Each featured Jenna talking to one of the addressees. The participant was introduced to Jenna, then the experimenter told the participant whether Jenna was addressing a baby, a little girl, or a doctor in each picture. The experimenter then said "Let's listen to Jenna talk. It's your job to tell me which picture matches what the Jenna says." The stimuli were presented as follows:

Infant-Directed speech Trials
Top pair: Speaker-Jenna Addressee-Baby Audio-*Awww, What's your name?*
Bottom Pair: Speaker-Jenna Addressee-Doctor or Peer *Nice to meet you, Buh-bye!*

Casual speech Trials
Top pair: Speaker-Jenna Addressee-Peer Audio-*Hey, What's your name? Nice*
Bottom Pair: Speaker-Jenna Addressee-Baby or Doctor *t'meet 'cha. See ya' later.*

Formal speech Trials
Top pair: Speaker-Jenna Addressee-Doctor Audio-*Excuse me please, what is*
Bottom pair: Speaker-Jenna Addressee-Baby or Peer *your name? It is very nice to meet you. Goodbye.*

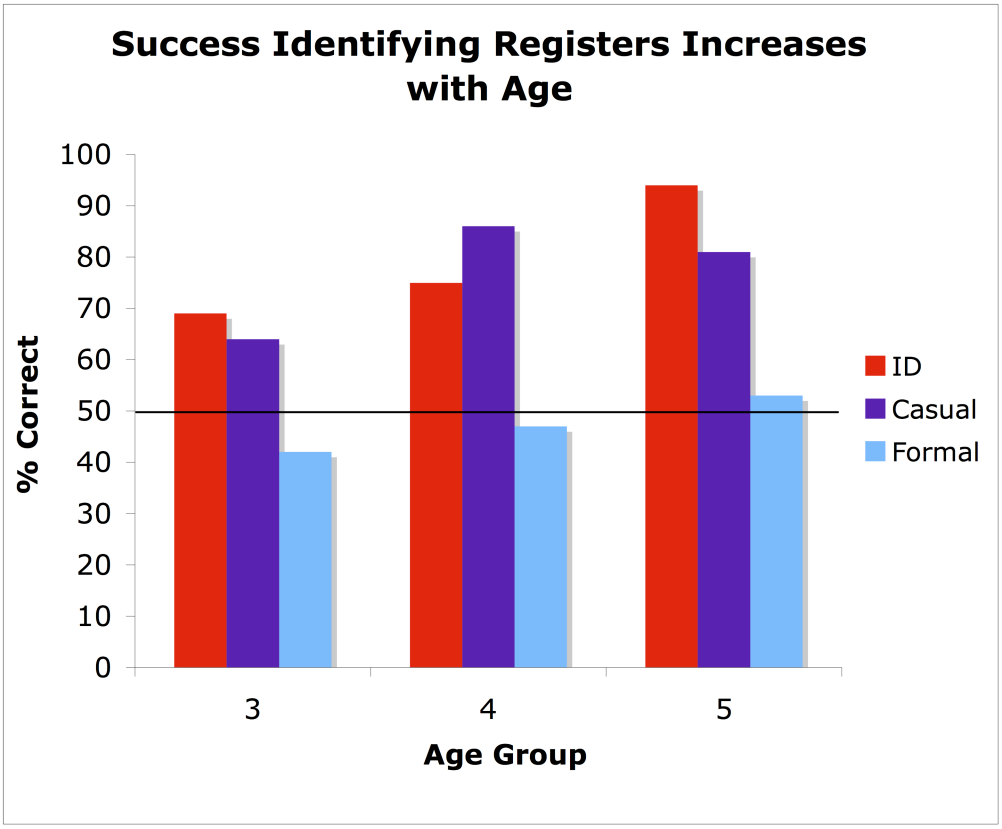
Each participant completed a total of 6 trials. Each register was tested twice, with the correct target picture appearing once on the top and once on the bottom. The order in which the registers were tested was counterbalanced between subjects. After each trial the experimenter collected qualitative data while giving positive feedback, saying "Good job! How did you know that?" Register comprehension was demonstrated by subjects who selected the picture of Jenna speaking to the baby when the Infant-Directed stimulus was played, the peer when the Casual stimulus was played, and the Doctor when the Formal stimulus was played.

## *Results*

A repeated measures ANOVA was conducted with age and register as independent variables and percent correct as the dependent variable. A main effect was found for age group ($F(2, 51) = 5.76$ $p<.006$). A main effect for register was also found ($F(2, 98) = 15.03$, $p<.001$). A multi-variable ANOVA found no interaction between age group and register. A post-hoc comparison (Tukey's HSD $p<.05$) was done in order to compare the performance of the different age groups. The mean difference between the three- and five-year-old groups was significant. The four-year-olds did not differ significantly from either the three-year-olds or the five-year-olds. Figure 2 shows the mean percent correct for subjects in each age group with a line at 50% indicating the level of chance.

Children performed above chance on the Infant-Directed ($t(1, 53)=6.9$, $p< .001$) and Casual ($t(1, 53)=6.2$, $p<.001$) register trials. Chance was set at 50% because the forced choice test design meant that subjects selected one of two pictures in each trial. The results for the Formal speech register were not significant at the 50% chance level. Inspection of the data revealed a baserate effect for the doctor pictures. Subjects had a

lower level of chance on Formal speech trials because they chose the doctor picture less frequently overall. Because their baserate of selecting the doctor picture was low, the level of chance was lower as well. To see if the preference for non-doctor pictures was




responsible for the below chance performance on Formal speech trials, we calculated the baserates of Doctor, little girl, and baby picture selection. By averaging the overall rate at which the pictures of doctors were selected in each trial a recalibrated baserate was found for each type of addressee. The recalibrated level of chance for selecting the doctor picture was 28%. Using this as chance shows that results for the Formal speech register were significant and followed the same trend as the Infant-Directed and Casual Registers (Fig. 3). Using the same process to calculate the baserate for the other pictures revealed that the actual level of chance for pictures of little girls was 56%. For pictures of babies the level of chance was 47%. Subjects in each age group were still significantly

successful at the p<.005 level when their performance was reevaluated using these levels of chance instead of 50%.

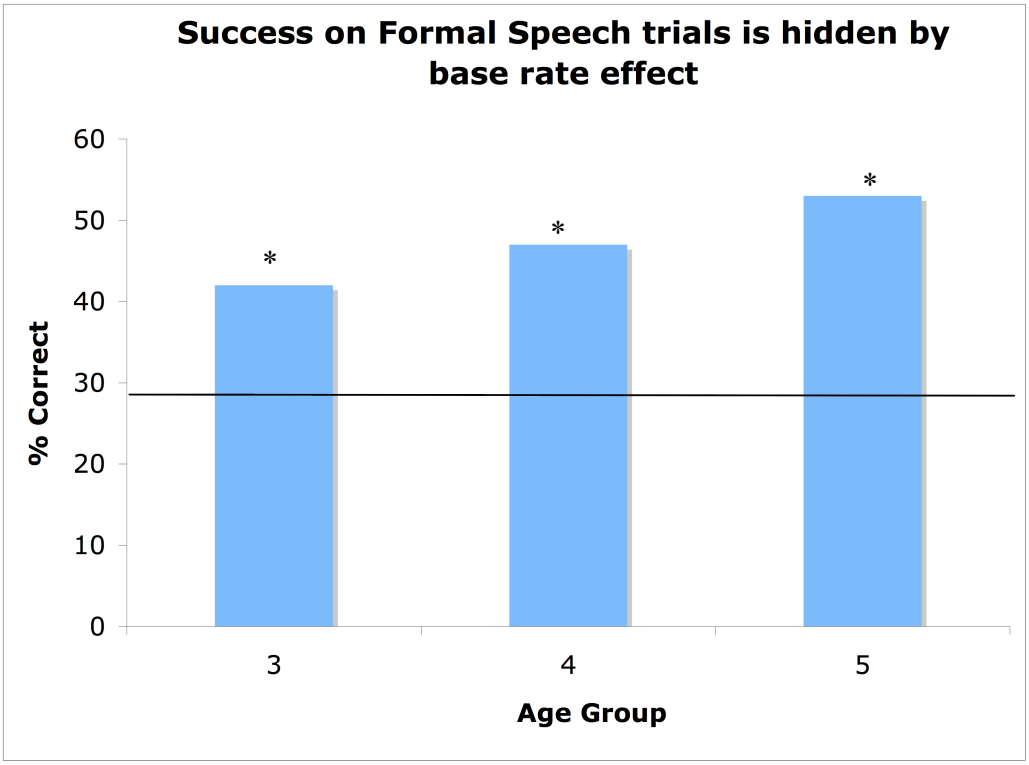



Fig. 3

An Asterisk (*) indicates significance p<.001

Paired samples t-tests found that the baby-doctor picture pairing produced the most correct responses ($t(1,53)=5.1$, $p<.001$). The doctor-peer pairing produced similar results ($t(1,52)=4.4$, $p<.001$). The baby-peer pairing had an insignificant difference in means.

When asked to give an explanation of their selection after each trial, 28 subjects responded at least once. Of those 28, 71% made at least one comment about Infant-Directed speech. 25% said they chose the picture of the baby because Jenna said *awww*. 21% said they chose the non-baby because Jenna did not say *awww*. 25% of the subjects described some aspect of Infant-Directed speech, calling it “cute,” “babyish,” or "Sweet". They used similar words to describe the infant itself. 14% of the responders gave at least one comment that contained information irrelevant to the task but did address the correct

target picture, for example, "'cause the baby's wearin' a diaper." Overall, three- and four-year-old subjects in the current study outperformed their peers in Wagner's study. Five-year-olds in the current study outperformed Wagner's subjects on the Infant-Directed and Casual registers but were less successful than Wagner's subjects on the Formal speech trial.

## *Discussion*

This study was conducted to find out when children can comprehend the social cues embedded in speech and how their understanding varies across three common registers. Overall, the children tested demonstrated register comprehension starting at age three. This is earlier than the age of production established by Shatz & Gelman and others in previous studies (1973). The results of this study indicate that register acquisition follows a timeline similar to other areas of language development in that children can comprehend this aspect of speech before they can produce it. Children outperformed their younger peers on each of the three registers. Although the five-year-olds were more likely to successfully identify the addressee of a given register than three-year-olds, even the subjects in the three-year-old age group were able to process the social information that the Infant-Directed and Casual speech registers contained. That information allowed them to select the appropriate addressee. The subjects also showed that they could use their knowledge of the formal register to contrast with other registers, though their performance with that register was not above significance. The doctor picture baserate effect could be a result of the experimental design. To control for the effects that the gender of speaker or addressee's might have, all the addressees were female. The infants were dressed in gender-neutral attire. At the beginning of the study subject was asked to

label the pictures as either babies, little girls, or doctors. Multiple subjects made the mistake of calling a doctor a nurse. It is possible that nurses are afforded less formal speech than doctors. If that is the case it could have lead the children to attribute Casual speech to the doctors rather than Formal. This was the case in Andersen's study (1990). She found that when given male and female puppets wearing matching lab coats, all four- to seven-year-old subjects labeled the female a nurse and the male a doctor. They spoke differently when talking to and speaking for the doctor than the nurse. After considering Andersen's findings in relation to the findings of this study it seems that the results could reflect attitudes children have about gender and occupational stereotypes. Follow-up studies could test this hypothesis by varying between male and female speakers and between all-male and all-female addressees between subjects.

Subjects in this study did best in trials that paired pictures of doctors with pictures of babies. This was expected because Formal speech and Infant-Directed have addresses with very distinct characteristics. Children are told to speak formally to their elders (Nippold, Leonard, & Anastopoulos 1982). Infant-Directed speech is used almost exclusively with babies (Bombar 2005). The qualitative data suggests that subjects used their knowledge about Infant-Directed speech and babies as a reference point. The majority of the subjects' comments were in some way related to Infant-Directed speech. This suggests that children may be more comfortable with the Infant-Directed register than Casual and Formal speech. It is also possible that Infant-Directed speech is used with such a specific class of people regardless of speaking environment that it carries more definite social information. Future studies could look at how children would perform on a study of register comprehension that did not provide them with the

opportunity to use Infant-Directed speech as an anchor.

When considering the results of this study it is important to acknowledge the limitations in the experimental design. It is possible that children were able to successfully identify the appropriate addressees in this study because of the specific registers that were used as variables. Subjects were tested on their comprehension of three very dissimilar, very common registers. The results of this study reflect the understanding that three- to five-year-olds have of Infant-Directed, Casual, and Formal speech. They should not be used to make generalizations about children's abilities to understand and withdraw the social information carried by speech utterances in novel registers. Children unfamiliar with the airplane environment and the speech register used by onboard pilots would not show the same pattern of comprehension that the participants in this study did. Subjects might have also performed differently had the comprehension of more closely related registers been tested. Including picture of dogs and Pet-Directed speech audio stimuli might have lowered the mean percent correct on Infant-Directed trials because Pet-Directed and Infant-Directed speech have similar prosody and intonation patterns. The use of Jenna as a speaker also limits how far the findings of this study can be generalized.

One of the main differences between Wagner's study and the current study is that the audio stimuli in this study were filtered through Jenna, a little girl. Because subjects were roughly the same age as Jenna, it is possible that their shared social perspective gave them an advantage that they would not have had if Jenna had been an adult speaker. Future studies could attempt to replicate the findings of this study using speakers who the subjects would not consider peers. Because Wagner's study used a speaker with an

indefinite age it is difficult to determine the relationship between the speaker and the three- to five-year-old subjects. Replicating the current study with an adult Jenna character as the speaker could provide more information about the types of social relationships that children are knowledgeable about. If children succeeded in this study because they relate to Jenna, the proposed modification would result in lower performance. If their performance on the proposed study was not affected by the social category of the speaker, that would indicate that children are able to use their Theory of Mind skills to determine how people in different roles speak. Using an adult speaker would also allow a distinction to be made between Casual speech reserved for speaking to peers and Child-Directed speech. If children really understand the Casual register and the social information that it carries they would be able to determine when an adult would use it. In the current study, Casual speech and Child-Directed speech could not both be tested because Jenna's status as a little girl meant that the addressees for the two registers were the same.

The main changes this study made to Wagner's original design were use of a child speaker, the paired picture design, the inclusion of Doctors instead of Teachers, and the exclusion of Spanish-language stimuli. The individual effects that these changes had on the results cannot be disentangled. However, the findings suggest that some aspect of this study makes it easier for children ages three to five and gives them a better opportunity to show their knowledge of the Infant-Directed, Casual, and Formal registers. The future studies proposed thus far would tease apart the effects of the four modifications while expanding our understanding of how children think about and use language.

One aspect of Wagner's study that was not changed in the current study was the

exclusion of social environment cues. It is not yet known how strong a cue speaking environment is when weighed against the nature of the social relationship between two speakers. It is possible that one of these factors has more influence on the selection of the appropriate register than the other. Formal speech occurs when a speaker is cued by either the authoritative social standing of an addressee or the formality of a situation. In the current study situational social cues were eliminated from the pictures. Following experiments could introduce situational cues. A picture of Jenna speaking to a peer in a casual situation could be paired with a picture of Jenna speaking to the same peer in a formal situation. The same pairings could be used for pictures of babies and adults. It is possible that situational cues would have a stronger affect on the application of the Casual register than on Formal and Infant-Directed because the Formal and Infant-Directed registers are used exclusively with certain types of people. The speaker-addressee relationships between Jenna and babies and between Jenna and Doctors could be more resistant to environmental cues than the peer-to-peer relationship because the Casual register is more neutral. It is also possible that children understand registers differently than adults. They may place more or less emphasis on environmental cues than adults.

Although the relationship between environmental cues and register comprehension has not yet been studied, some work has been done on environment and other aspects of language variation. The results of the current study suggest an interesting parallel between the meta-linguistic knowledge of monolingual and bilingual children. They may engage in similar processes when thinking about language and how their addressees determine how they will speak. Many bilingual children speak one language

at home and another at school. They know that there are certain people who must always be addressed in the same language (Paez, Tabors, Lopez 2007). Children fluent in more than one language must use social cues to determine which language is appropriate to use in a given environment with a given person. This study found evidence of similar meta-linguistic knowledge in monolingual English-speaking children. This similarity between register and language in general deserves more research attention. Reintroducing Wagner's Spanish-language stimuli to the current study could be a useful tool in determining whether the processes involved in register and language selection are comparable. An experiment that varied stimuli language and register within-subjects could be used to test Spanish-English bilingual children on the ways that they think about register and language use.

In addition to providing a foundation for the proposed future studies, the findings of this study could be relevant to research on children's attitudes toward accented speech, polite speech, and speakers in general. They could also be helpful to researchers looking for new ways to track social development in typical and atypically developing children. The findings of this study have helped to establish the similarities and interactions between the areas of social and linguistic development in early childhood.

*References*

Andersen, E. (1992). Speaking with style: the sociolinguistics of children. London: Routledge.

Biber, D. & Finegan, E. (1994). An analytical framework for register studies. *Sociolinguistic perspectives on register*. New York: Oxford University Press, 31-58.

Bombar, M. (2005). Babytalk as a communication of intimate attachment: An initial study of adult romances and friendships. *Personal Relationships*, 137-158.

Danet, B. (1980). Language in the legal process. *Law and Society Review, 14,* 445-565.

Fernald, A. (1992). Human maternal vocalizations to infants as biologically relevant signals: An evolutionary perspective. In P. Bloom (Ed.), *Language Acquisition*, Cambridge, MA: MIT Press. 51-94.

Fraser, C., Bellugi, U., & Brown, R. (1963). Control of grammar in imitation, comprehension, and production. *Journal of Verbal Learning and Verbal Behavior, 2*, 121-135.

Garnica, O. (1977). Some prosodic and paralinguistic features of speech to young children. In C. E. Snow & C. A. Ferguson (Eds.), *Talking to children: Language input and acquisition*, London: Cambridge University Press, 63-88.

Huttenlocher, J. (1974). The origins of language comprehension. *Theories in cognitive psychology: the loyola symposium*. Lawrence Erlbaum Associates; distributed by the Potomac: Wiley Halsted Press Division, 331-368.

Maskey, S., & Hirschberg, J. (2005). Comparing lexical, acoustic/prosodic, structural and discourse features for speech summarization. Presented at Interspeech 2005.

Mehler, J., Jusczyk, P., Lambertz, G., Halsted, N., Bertoncini, J., & Amiel-Tison, C. (1988). A precursor of language acquisition in young infants. *Cognition*, *29*, 143-178.

Nippold, M., Leonard L., & Anastopoulos, A. (1982) Development in the use and understanding of polite forms in children. *Journal of Speech and Hearing Research, 25,* 193-202.

Paes, M., Tabors, P., & Lopez, L. (2007). Language and literacy development of spanish-speaking preschool children. *Journal of Applied Developmental Psychology*, *28*, 85-102.

Shatz, M. & Gelman, R. (1973) The development of communication skills: Modifications in the speech of young children as a function of listener. *Monographs of the Society for Research in Child Development, 38(5)*, 1-38.

Spence, M. J., Rollins, P.R., Jerger, S. (2002) Children's recognition of cartoon voices. *Journal of Speech, Language, and Hearing Research*, *45*, 214-222.

Van de weijer, J. (1997). Language input to a prelingual infant. A. Sorace, C. Heycock, & R. Shillcock (Eds.), Proceedings of speech prosody GALA '97 conference on language acquisition. Edinburgh, Scotland, 290-293.

Wagner, L., Greene-Havas, M. & Gillespie, R. Development in children's comprehension of linguistic register. In press.

# Appendix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